NATURAL RESOURCES CONSERVATION SERVICE

CONSERVATION PRACTICE STANDARD

POND SEALING OR LINING - FLEXIBLE MEMBRANE

(Each)

CODE: 521A

DEFINITION

A manufactured hydraulic barrier consisting of a functionally continuous sheet of synthetic or partially synthetic, flexible material.

PURPOSE

To control seepage from water and waste impoundments for water conservation and environmental protection.

CONDITION WHERE PRACTICE APPLIES

On ponds and water storage structures that require treatment to control seepage rates within acceptable limits.

On waste storage and waste treatment facilities built in or of excavated earth, and which require treatment to prevent the migration of contaminants from the site.

CRITERIA

Structures to be lined shall have been constructed to meet all applicable NRCS standards. All inlets, outlets, ramps, and other appurtenances may be installed before, during, or after the liner placement, but shall be done in a manner that does not damage or impair the proper operation of the liner.

All flexible membranes shall be certified by the manufacturer to be suitable for the intended use.

Design of the flexible membrane shall be in accordance with manufacturer recommendations. All flexible membrane installations shall meet the material and installation requirements of the plans and specifications provided for each installation, and shall be certified by the installer. A sequence of installation shall be included with the design to insure the liner is installed properly.

Minimum Criteria for Membranes

Type	Limiting Parameter
HDPE	40 mil thickness
LLDPE	40 mil thickness
PVC	30 mil thickness
GCL	0.75 lb./sq ft (bentonite)
EPDM	45 mil thickness

HDPE = High Density Polyethylene
LLDPE = Linear Low Density Polyethylene
PVC = Polyvinyl Chloride
GCL = Geosynthetic Clay Liner
EPDM = Synthetic Rubber

Select soil materials shall be used as cover for liners where required for the proper performance, protection, and durability of the installation. Cover soils shall not contain sharp, angular stones or any objects that could damage the liner. Maximum allowable particle size of soil cover material shall be 3/8-in (10 mm), unless the liner is cushioned by a needle punched, non-woven geotextile. Cover materials shall be stable under all operational and exposure conditions.

Subgrade preparation shall conform to manufacturer recommendations. The side slopes shall be no steeper than 2.5 horizontal to 1 vertical. Sub-grade materials shall not contain sharp, angular stones or any objects that could damage the liner or adversely impact its function. A non-woven geotextile (weighing at least eight ounces per square yard) shall be installed between the liner and sub-grade to

protect the liner from damage by the sub-grade material and allow gas passage to the vents.

All structures shall be fenced to protect the liner from damage and for the safety of humans, livestock, wildlife, and pets. Safety ropes or ladders shall be installed in at least four locations around the facility to allow people to climb out if they accidentally fall in. The safety rope/ladder shall be secured at the top and extend from the top of the facility to the bottom.

Manufacturer recommendations shall be followed with regard to protection from weather and exposure.

All liners shall be designed to vent off gas build up below the liner. Manufacturer's recommendations shall be followed regarding vent type and spacing. If venting is not specified by the manufacturer, the non-woven geotextile installed to protect the liner from damage by the sub-grade material shall be designed to vent gases. The bottom shall be graded no flatter than two percent in order to vent gases toward the outside.

On all waste storage facilities and treatment lagoons, a leak detection system shall be installed. The system shall have a minimum of one perforated drain installed at least two feet directly under the liner. This drain shall be directed to an outlet that is easily accessible. A valve shall be installed at the outlet in the event a leak is detected. The leak detection system maybe part of the drainage system to lower the seasonal high water table under the facility.

CONSIDERATIONS

Ballast such as sandbags may need to be installed to prevent the liner from moving from wind action when the facility is empty.

Wildlife fencing which is at least six feet tall should be considered to keep deer and other wildlife from accidentally entering the facility and possibly damaging the liner.

If high water tables could adversely affect the proper functioning of the facility, interceptor or relief type drainage systems should be considered to control uplift pressures.

PLANS AND SPECIFICATIONS

Plans and specifications shall be prepared for specific field sites in accordance with this standard and shall describe the requirements for applying the practice to achieve its intended uses.

OPERATION AND MAINTENANCE

Operation and Maintenance shall be in accordance with manufacturer's recommendation. An operation and maintenance (O&M) plan shall be prepared for the Flexible Membranes and any other associated conservation practices. The O&M plan shall be developed in accordance to manufacturer's recommendation. The O&M plan shall be consistent with the purposes of the practice, its intended life, safety requirements, and the criteria for its design. Maintenance needs are to be discussed with the landowner or operator who is responsible for maintaining the practices installed with NRCS assistance. Any hazards must be brought to the attention of the responsible person. Prior to construction, sufficient copies of the O&M plan shall be provided to the owner/operator, designer, and approving agencies. The owner shall sign the O&M plan to indicate an understanding of the requirements and a commitment to operate and maintain the area as specified.

If leaks are detected:

- The valve in the leak detection system shall be turned off to prevent the effluent from leaving the system and causing downstream environmental damage.
- The effluent from the leak detection system shall be pumped into the facility until the leak can repaired.
- The facility shall be pumped and clean out at the next scheduled opportunity and the liner repaired.